

# GAS DIFFUSION ELECTRODE AND CATALYST FOR ELECTROCHEMICAL OXYGEN REDUCTION AND METHOD OF DISPERSING THE CATALYST

## Abstract

An improved gas diffusion electrode composed of a perovskite-type oxide dispersed in a mixture of carbon black and a hydrophobic binder polymer. An improved catalyst for use in the electrochemical reduction of oxygen comprising a perovskite-type compound having alpha and beta sites, and having a greater molar ratio of cations at the beta site. A particularly good reduction catalyst is a neodymium calcium manganite. An improved method of dispersing the catalysts with carbon in a reaction layer of the electrode improves performance of the electrode and the oxygen reduction process. This is provided by adding carbon black to an aqueous solution of metal salts before it is heated to a gel and then to a char and then calcined. Optionally, a quantity of the desired oxide catalyst can be premixed with a portion the carbon before adding the carbon to an aqueous solution of the metal

salts to be heated. The amount of premixed metal oxide is chosen in conjunction with the amount of metal salts to provide the desired molar ratio after heating and calcining of the aqueous solution.